Post-Meroitic cemetery at the Khor Shambat site in Sudan

Abstract: Archaeological research at the Khor Shambat site (in Omdurman in central Sudan) has been conducted since 2012, when a team of scientists from the Institute of Archaeology and Ethnology Polish Academy of Sciences (Poznań) launched a salvage exploration of a Neolithic site and cemetery damaged by road construction. Research is now conducted within the scope of a grant from the National Science Centre, Poland (No. 2015/17/D/HS3/01492). Three seasons of fieldwork since 2016 have focused on the extensive prehistoric settlement spanning nearly 4000 years, from the early Mesolithic to the late Neolithic. As it turned out, the site had attracted not only Mesolithic hunters-gatherers and Neolithic shepherds, but was also used as a burial place for the Meroitic and post-Meroitic inhabitants of the region. A survey of about 1% of the surface of the Khor Shambat site (KSH 1) resulted in the discovery of 66 graves; 12 of these are probably post-Meroitic and of these three presented a rich and interesting array of burial goods, including imports from the Far East. At the same time, KSH 1 is one of the southernmost post-Meroitic cemeteries.

Keywords: Khor Shambat, Post-Meroitic, cemeteries, graves, anthropological analysis, burial goods

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The designation Khor Shambat is derived from the name of a large wadi joining the Nile approximately 8.5 km north of the confluence of the White and Blue Niles and around 1.2 km north of the research site [*Fig. 1*]. The site is located on a small hill of limestone covered with heavily eroded iron mudstone, forming a culturally sterile layer. The thickest accumulation consists of silty sands, probably of aeolian origin, reaching more

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than 1.50 m in depth counting from the summit point. The stratigraphy reflected in these accumulations (from 1.50 m to 0.90 m below the modern surface) is composed of Mesolithic and Neolithic remains, containing numerous fragments of stone artifacts, shells, animal bones and ceramics. The surface layer was a gravel midden yielding mixed prehistoric material, ranging in thickness from a few to several dozen centimeters. The site is regrettably disturbed, not only by road construction, which was the reason for undertaking archaeological salvage work, but also by modern residential building, farming and animal husbandry.

Investigation of this multiphase sepulchral and settlement complex, dated primarily to the Mesolithic and Neolithic periods, recorded burials that could be associated with younger, Meroitic and post-Meroitic settlement in central Sudan. Using the site as a preferential burial ground, these settlers also contributed to wide-scale damage of prehistoric cultural layers. Post-Meroitic grave struc-

Fig. 1. Location of the Khor Shambat 1 site in Sudan (IAE PAN Poznań Khor Shambat Project | processing P. Wiktorowicz and M. Jórdeczka)

tures were particularly destructive in this respect. The trench section below Grave 28 revealed that the grave had destroyed about 50 m² of the Neolithic site at the base and about 100 m² in the younger layers above.

The current summit of the site is at about 384–385 m a.s.l. and about 8 m above the modern overflow level of the Nile. It is limited from the north and south by two small gorges (khors), which carry water to the Nile valley during rainfall.

RESEARCH

The site was investigated in nine excavation trenches, mostly aligned north–south, running alongside the eastern edge of a local road in Omdurman. During the first season in 2012, four small excavation trenches (I, III, IV–V) were opened on the southern slope of the hill. The goal was to investigate a major concentration of skeletal burials visible in the road cut. Several burials were examined, including distinctive Neolithic graves and what are probably Meroitic graves (without burial

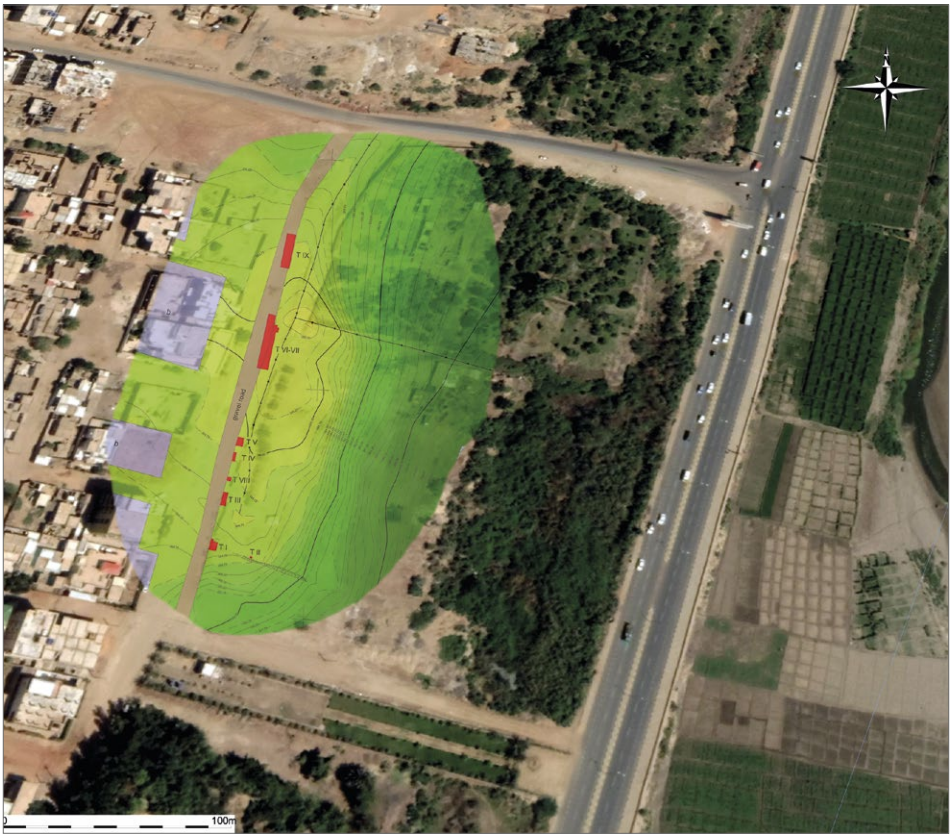

Fig. 2. Site map of Khor Shambat 1 with the location of the excavation trenches (IAE PAN Poznań Khor Shambat Project | P. Wiktorowcz and M. Jórdeczka, based on own surveying)

goods) (Bobrowski et al. 2016). In 2017, a small excavation trench VIII was dug in this part of the site, securing a burial that had become visible in the road-trench section and was in threat of being damaged by either rainfall or scavenging animals (Jórdeczka et al. 2020a) [*Figs 2–3*].

The main area of research in the first three grant seasons from 2016 to 2018 was located on the hill summit and its northern, slightly inclined slope. Three large excavation trenches VI–VII (combined in the course of the work) and trench IX were excavated there. The stratigraphy in trench VI yielded an undisturbed sequence of Mesolithic and Neolithic layers, while revealing perturbations associated with post-Meroitic occupation. The western part of trenches VI–VII and all of trench IX were situated within the road lane; they were therefore lacking the Neolithic and partly Mesolithic stratification. However, the layer of gravel used for road construction turned out to be superimposed on the bottoms of burial pits and prehistoric features (Jórdeczka et al. 2020b).

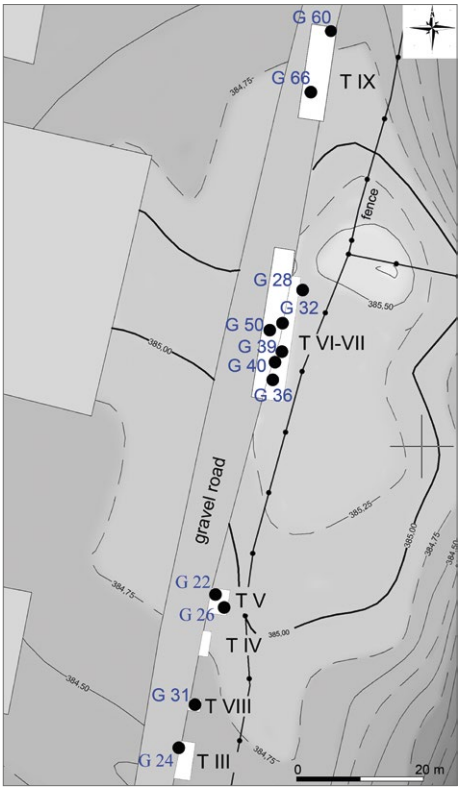

Fig. 3. Location of post-Meroitic graves in the excavation trenches at Khor Shambat 1 (IAE PAN Poznań Khor Shambat Project | processing P. Wiktorowicz and M. Jórdeczka, based on own surveying)

GRAVES AND BODY ARRANGEMENTS

In the process of surveying this multiphase sepulchral and settlement complex, the team recorded burials that could be associated with younger, post-Meroitic settlement in central Sudan. Three of the graves contained an array of burial goods permitting more precise chronological determinations. Another nine graves without burial goods were classified in this settlement phase on the grounds of mainly formal similarities: shape of burial pit, type of fill, position of the skeleton in the pit and stratigraphic observations. No traces of any kind of grave superstructures have been preserved. The three most distinctive graves were located on the summit (Grave 28, trenches VI–VII) and northern slope of the hill (Graves 60 and 66, trench IX). More burials were uncovered on a gently inclined slope south of the summit (Graves 32, 36, 39, 40, 50, trench VI; Graves 22, 26, trench V; Grave 31, trench VIII; Grave 24, trench III).

GRAVE 28

Grave 28 was recorded closest to the summit of the hill. The well preserved stratigraphy permitted a reconstruction of the process of formation. The burial of an adult woman (*adultus*), aged 30–35 years, was located in a pit, about 1.40 m below the modern ground level. The

Fig. 4. Khor Shambat 1. Grave 28: top, burial with the grave goods, looking northeast; bottom, set of ceramic vessels and beads from bracelet and necklace (IAE PAN Poznań Khor Shambat Project | photos M. Jórdeczka)

pit outline was observed at a depth of 0.60 m below the surface. At the base, it was oval in shape, nearly circular, the diameter being about 1.20 m. The section revealed a characteristic bell-shaped form narrowing toward the top; above the 0.60 cm level (from the surface) the pit expanded to about 8–10 m in diameter, taking on an funnel-like shape. The body had been laid on its right side, the head facing south and the legs slightly drawn up [*Figs 4* top, *5*]. Stressors near the vertebrae included somewhat flattened vertebral bodies, Schmorl's nodes and no osteophytes; there were also deformations of the thoracic vertebrae and partial lumbarization of the first sacral vertebra (S1). Life stature of the deceased was estimated at 165 to 167 cm (Stanaszek 2016). The grave was covered with a mound of large stones (blocks and sandstone slabs, averaging 10–25 cm in size). The grave goods comprised four vessels in the legs: a beer jar and three bowls. Several dozen beads, probably from a necklace (but in no clear arrangement) were found near the cervical vertebrae and head, and about a dozen beads from a presumed bracelet lay by the folded hands of the deceased [*Fig. 5*].

GRAVES 60 AND 66

The two graves on the northern slope of the hill contained burials of adult men, archers to judge by the characteristic burial goods. Modern road trenching and the removal of several dozen centimeters of overburden in trench IX

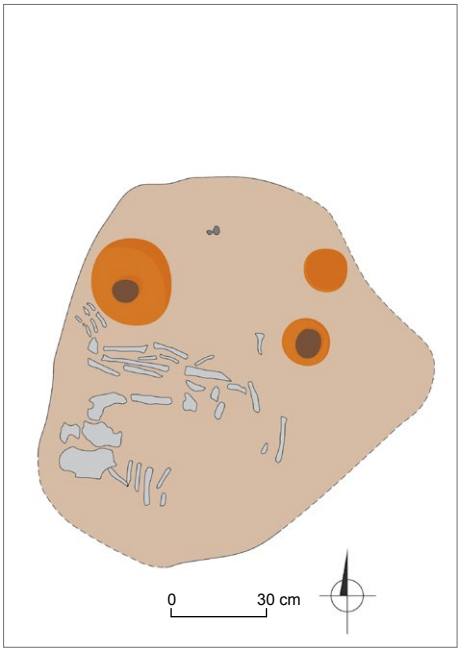

Fig. 5. Khor Shambat 1: Grave 28 (IAE PAN Poznań Khor Shambat Project | processing P. Bobrowski and K. Mugaj)

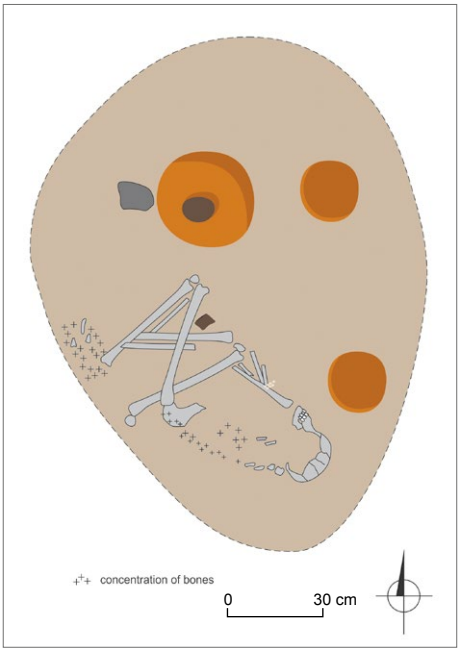

Fig. 6. Khor Shambat 1. Grave 60 (IAE PAN Poznań Khor Shambat Project | processing P. Bobrowski and K. Mugaj)

left for examination only the base section of the burial pits, set already in the culturally sterile layer of eroded iron mudstone.

The northernmost Grave 60 had an ovoid pit with maximum dimensions of 1.60 m by 1.25 m. The deceased was most probably a young man aged 18–20

Fig. 7. Khor Shambat 1. Grave 60: top, top view of the burial; bottom, clay vessel and personal jewelry, as well as an archer's ring from the grave goods (IAE PAN Poznań Khor Shambat Project | processing M. Jórdeczka)

(*iuvenis/adultus*), lying on his right side, with legs drawn up (the right leg more), the head to the southeast and facing north [*Figs 6, 7* top]. He had severe porotic hyperostosis of the right orbital roof (*cribra orbitalia*), severe alveolar prognathism as well as calculus and tooth decay. Stature was estimated at 166–169 cm (Stanaszek 2018).

Three vessels were placed as grave goods in the burial pit: a beer jar and an open bowl (in the northern part of the pit at knee level), and a biconical bowl directly in front of the man's face. A stone archer's ring was found between the knees where the left hand rested, and two quartz-bead bracelets were lying by the long bones of the right arm. Several dozen different beads from a necklace were recorded near the skull [see *Fig. 7*]. The grave pit was covered with an overlay of stones.

Grave 66 in the southern part of trench IX proved to have an extensive oval burial pit partly intersecting two smaller burial pits with Neolithic burials. Its diameter was about 2.10 m. The deceased, around the age of 25–35 (*adultus*), had been buried with grave goods in the southern part of the grave. He was lying on his right side with the head to the southeast, facing north, and

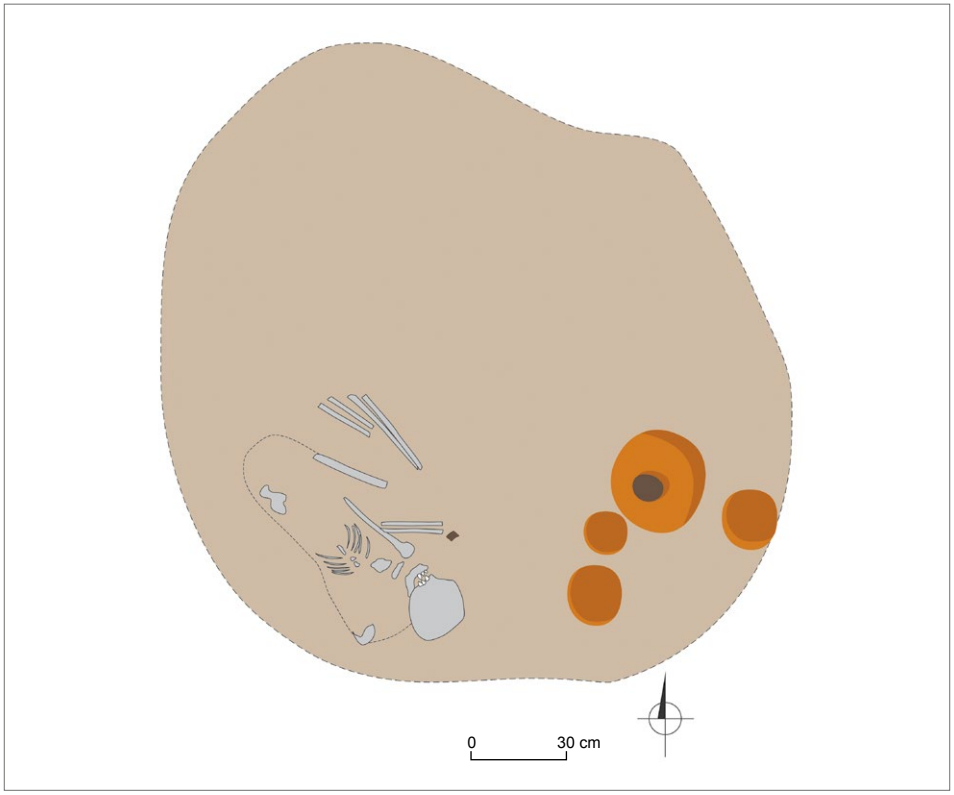

Fig. 8. Khor Shambat 1. Grave 66 (IAE PAN Poznań Khor Shambat Project | processing P. Bobrowski and K. Mugaj)

Fig. 9. Khor Shambat 1. Grave 66: top, top-view of the burial; bottom left, clay vessels; bottom right, personal jewelry, archer's ring and iron arrowheads from the grave goods (IAE PAN Poznań Khor Shambat Project | processing M. Jórdeczka)

legs drawn up tightly [*Figs 8, 9* top]. The individual had severe prognathism and calculus. He was probably around 171–174 cm tall (Stanaszek 2018). The grave goods comprised vessels (a beer jar and three bowls) standing near the head of the deceased. A stone archer's ring was found near the face, where the right hand was placed. Several dozen beads and three cowry shells, probably from a necklace and a diadem, were found near the temporal bones of the skull and the cervical vertebrae. Two iron arrowheads were found next to the body by the back. The grave was covered with a loose overlay of stones (partly preserved, most likely damaged during road construction) [see *Fig. 9*].

The remaining post-Meroitic graves on the southern slope of the hill were devoid of burial goods and were classified by means of comparative analysis and stratigraphic observations. Part of the burials were laid in pits of oval, usually irregular shape (Graves 22, 24, 26, 31, 40) [*Fig. 10*, *Table 1*].

Grave 22 was the largest at 1.70 m by 0.70 m; it had an elongated shape widening near the legs. The burial pit of Grave 26 (partly examined) was probably of triangular shape (similarly widening near the knees). The burial pits of Grave 40 (1.10 m by 0.80 m) and most likely Grave 24 (partly examined) were shaped more regularly as ovals.

Grave 31 turned out to be an instructive example of grave formation (Jórdeczka et al. 2020a). The irregular oval burial pit, which probably had a funnel-like section, was wider on the eastern side, and was about 1.20 m by 0.80 m in size. The grave structure was first detected at a depth of around 0.60 m; the base reached a depth of 0.80 m below the present ground surface and was embedded in the culturally sterile iron mudstone layer [see *Fig. 10*]. The woman was between 40 and 50 years of age at death. She was laid out on her left side, her lower limbs drawn up, the right hand bent at a right angle and the left hand near her face. Her bones were poorly preserved and incomplete. The skeleton was rather gracile, the ossification process visibly complete (pedicles conjoined with the core), minor *cribra orbitalia*, reduced mandibular alveolar bone, growth of the right and left canine (C) in the jaw stopped *in vivo* in the alveolus, obliterated alveolus on the left M1–M3. Tooth decay was discovered near the root of the right canine (C) of the jaw, along with periodontitis. The estimated stature of this individual was 155 to 159 cm (Stanaszek 2017). The grave goods, if any, did not leave any traces.

Compared to the Neolithic burials, the burial pits were distinguished by a light gray/yellowish dusty sand fill, often containing damaged artifacts from older burials and fragments of Neolithic vessels and stone artifacts. The fill clearly stood apart from the sterile iron mudstone layer. In four cases (Graves 32, 36, 39, 50), however, the burial pit could not be traced. The skeletons were found lying directly on the culturally sterile layer. Data on the sex, age, body artculation and position, as well as major pathologies to be had from *Table 1*.

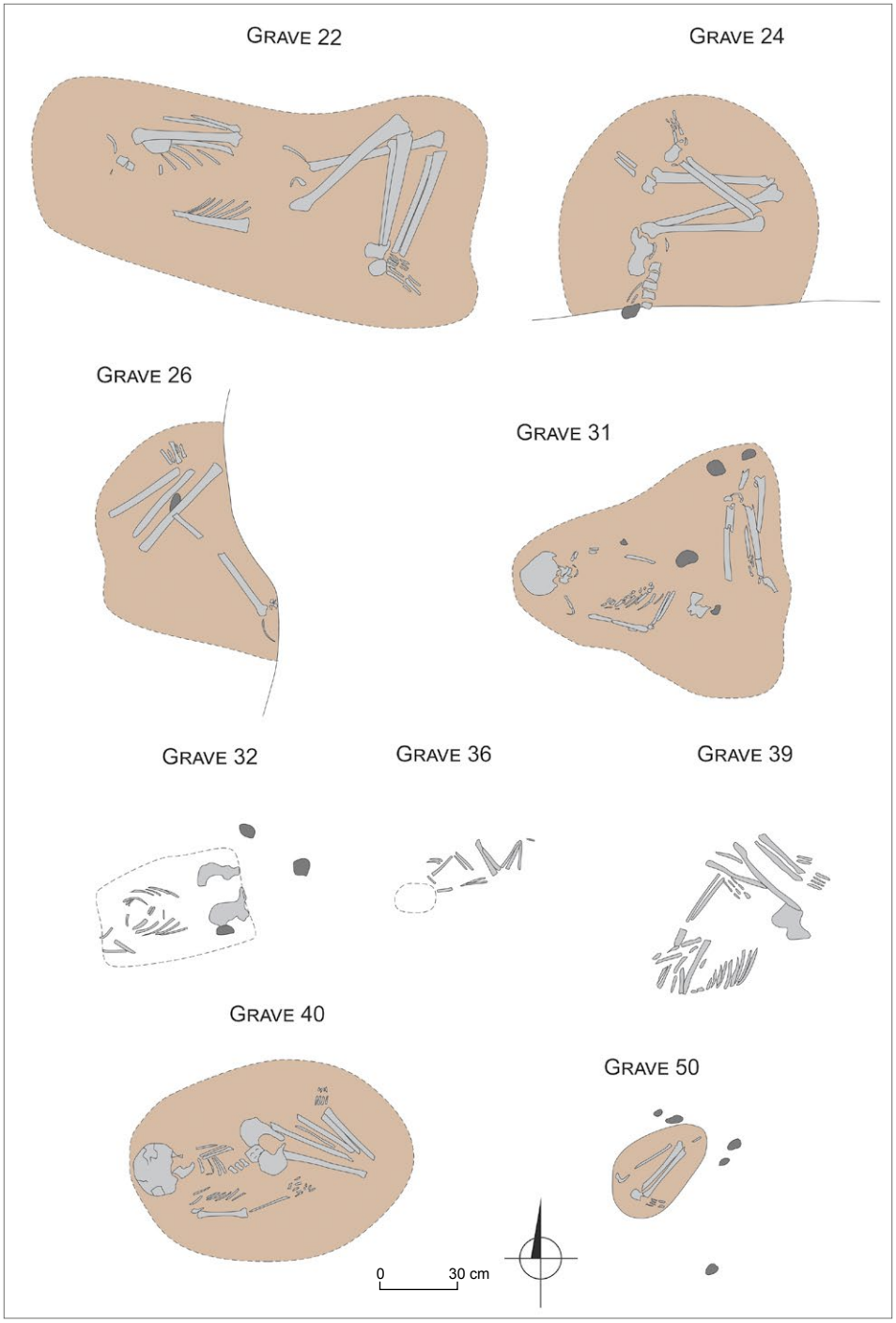

Fig. 10. Khor Shambat 1. Graves 22, 24, 26, 31, 32, 36, 39, 40, 50, without burial goods (IAE PAN Poznań Khor Shambat Project | processing P. Bobrowski, M. Jórdeczka and K. Mugaj)

Table 1. The skeletal remains from post-Meroitic graves without burial goods discovered at KSH 1, including sex, age, body position and major pathologies (Ł.M. Stanaszek)

Grave No.	Sex	Age	Body position	Notes/major pathologies
22	M	*Maturus* (40–50)	Lying on the back, legs drawn up slightly, left arm bent at the elbow to place the hand near the face, head oriented west and facing north.	Bones of hands and feet show signs of slight acromegaly (length of metatarsal II 9.0 cm); degenerative changes in the spine (osteophytes on C, degeneration of the surface of the vertebral bodies, strongly flattened vertebral bodies, osteophytes and Schmorl's nodes on L). Degenerative changes on the joint surfaces of the distal phalanges of the feet (rheumatoid arthritis?); thickened bones in the proximal phalanges of the hands and strong muscle attachments on the bones of the forearm suggesting intensive use of a bow; longitudinal bone defect in the distal part of the left femoral shaft (healed injury?); bone infiltration along the edge of the left fibula shaft (trace of healed injury?); reduced mandibular alveolar bone (periodontosis); calculus. Stature 187–190 cm (Stanaszek 2016).
24	M	*Maturus* (35–45)	Lying on the right side, legs drawn up slightly, head oriented west, facing south.	Slight osteophytes and Schmorl's nodes on the L5 vertebral body; inflammatory changes on the auricular surface of the left pelvic bone; post-inflammatory and stress lesions on the left femur above the patellar surface and on the popliteal surface. Stature 169–179 cm (Stanaszek 2016).
26	F	*Maturus* (35-55)	Lying on the left side, legs drawn up slightly, arms between the thighs, head oriented southeast, facing west.	Skeleton in the trench section (bones not fully examined); slight degenerative changes on the articular surfaces of the palm phalanges. Stature about 164 cm (Stanaszek 2016).

(continued overleaf)

Table 1. (continued)

Grave No.	Sex	Age	Body position	Notes/major pathologies
31	F	*Maturus* (35–55)	Lying on the left side, legs drawn up slightly, right arm bent at a right angle, left hand by the face, head oriented west and facing north.	Skeleton relatively gracile; minor *cribra orbitalia*; reduced mandibular alveolar bone, growth of the right and left canine (C) in the jaw stopped *in vivo* in the alveolus; obliterated alveolus on the left M1–M3, tooth decay near the root of the right canine (C) of the jaw, periodontitis. Estimated stature 155–159 cm (Stanaszek 2017).
32	F?	*Adultus/ maturus* (25–40)	Lying on the back with head to west, preserved especially well around the torso.	Skeleton relatively gracile; no age-related changes. Estimated stature 150–159 cm (Stanaszek 2017).
36	?	*Infans* (about 2)	Semi-fetal position on the right side, lower limbs contracted at the knees, upper limbs: left limb bent, right extended and head to west.	Skeleton gracile, non-ossified (including not fully formed deciduous teeth roots, non-fused vertebral arches and pelvic bones) (Stanaszek 2017).
39	F?	*Maturus* (40–50)	Lying on the left side, legs drawn up high; upper limbs: right one turned toward the face (no hand, skeleton disturbed by the trench cut), left one straight to the knees; head to southwest, facing north.	Ossification process completed (including pelvic crest); cervical vertebrae (slightly flattened vertebral bodies, osteophytes on the edges); minor calcaneal spurs; narrowing in the left distal humerus (mechanical?). Estimated stature 160–168 cm (Stanaszek 2017).
40	M?	*Infans* II (8–10)	Lying on the back, slightly turned to the right side; legs drawn up, head tilted to the left and oriented west, facing north.	Non-ossified skeleton (long bone pedicles separate; vertebral bodies fused, including *Th* newly fused; surfaces of vertebral bodies not ossified; non-ossified iliac crest; sacrum segmented).
50	?	*Maturus*	Arrangement of the lower leg fragments indicate a position on the left side with legs drawn up, probably with the head northeast and facing east.	Slight degenerative changes in the distal phalanges of the feet (Stanaszek 2018).

GRAVE GOODS

CERAMIC VESSELS

Ceramic vessels were found in three of the graves, and the set was relatively standardized consisting of three to four vessels. A beer jar appeared in all three sets. Two pieces found in Graves 60 and 66 had no decoration at all, while one piece, a vessel from Grave 28, was decorated with a simple imprinted ornament beneath the spout. All the graves also included two or three bowls in three basic types. Hemispherical open bowls were found in all of the burials: one in Grave 60 and two each in Graves 28 and 66. A globular bowl was found in Grave 28, and a biconical one in Grave 66.

Some of the hemispherical open bowls were decorated on the inside just below the rim with impressed (Graves 22, 66) and incised (Graves 22, 66) zigzag motifs. One of the bowls from Grave 60 had a simple herringbone impressed pattern. In a few vessels, the ornaments were filled with a red (Grave 66) or white paint. The spout on one of the bowls was additionally decorated with incisions [*Fig. 11*; see *Table 2* for a detailed description of the vessels].

PERSONAL ADORNMENT

Numerous beads representing the remains of personal adornment were found near the deceased in Graves 28, 60 and 66. The adult woman from Grave 28 probably had a necklace and a bracelet. The necklace consisted of at least 111 beads of a diameter of 4 to 6 mm, made of ostrich eggshell (threading holes drilled from one side) and a single globular bead of an unspecified (light gray) stone, 1 cm high and about 0.8 cm in diameter (threading hole drilled from both ends). The bracelet consisted of at least 10 beads of ostrich eggshell, the diameter varying from 3 to 6 mm, combined with a stone bead and two glass beads, all of globular shape. The stone bead was about 3 mm in diameter and dark gray in color. Of the glass beads, the green one had the same diameter, while the blue/navy blue one was 4 mm in diameter and 3 mm high [see *Fig. 4*].

Two bracelets and a necklace were found next to a man in Grave 60. One bracelet was made up of 18 quartz beads, of which 12 had a regular barrel shape (0.6–1.2 cm long, maximum diameter 0.6–0.9 cm with 0.2 cm diameter threading hole), two were of oblate shape (0.6–0.8 cm in diameter, threading hole 0.2 cm diameter) and four were tubular with rectangular section (0.8–0.9 cm long, 0.6–0.7 cm wide, threading hole and 0.2 cm diameter). The second bracelet was composed of 14 beads (13 barrel-shaped and one globular) of similar dimensions. The holes in the bracelet beads were drilled from both sides. The necklace consisted of at least 46 different beads. These included 24 pieces made of ostrich eggshell, eight of turquoise-colored faience, nine probably of carnelian and five of an unidentified gray stone. Ostrich eggshell beads had a diameter of about 0.5 cm (threading hole drilled from one side, diameter 0.2 cm). Faience beads came in two shapes: tubular (six pieces, 0.3–0.8 cm long, 0.3–0.6 cm wide, threading hole 1.5 cm diameter) and oblate (diameter

0.2 to 0.3 cm, threading hole 1.5 cm diameter). Carnelian beads were of similar shapes and sizes, including three tubular and six globular pieces. Five oblate beads of gray stone had a diameter of 0.2 cm and a threading hole 1 mm in diameter [see *Fig. 7*].

Three cowry shells found near the body in Grave 66 were probably part of head decoration. The necklace consisted of 210 different beads. The most numerous were ostrich eggshell beads (100), their dimensions similar to that of beads from Grave 60; 19 beads were made of quartz, includ-

Table 2. Vessels from Graves 28, 60 and 66 at the post-Meroitic cemetery in KSH 1; key: Rd – rim diameter, Md – maximum diameter, H – height, Th – body wall thickness (M. Jórdeczka)

Grave No.	Vessel type	Description
28	Beer jar [*Fig. 11:1*]	Brown ware, upper part burnished. Simple impressed decoration below the rim top. Break brown with black core, fine to medium vegetal temper. Rd 9 cm, Md 26 cm, H 30 cm
28	Unrestricted bowl [*Fig. 11:4*]	Grayish-brown, break black, fine organic temper. Inside, below the rim, impressed zigzag with traces of white paste filling. Rd 16.5 cm, H 12 cm, Th 6.5 mm
28	Unrestricted bowl [*Fig. 11:3*]	Grayish-brown, break black, fine organic temper. Decorated with an incised zigzag inside below the rim. Oblique cuts on the rim top. Rd 15.5 cm, H 12 cm, Th 6.5 mm
28	Globular, restricted bowl [*Fig. 11:2*]	Dark gray-brown, simple rim. Rd 8.5 cm, Md 14.5 cm, H 11 cm, Th.6.5 mm
60	Beer jar	Brown ware, upper part burnished. Simple impressed decoration below the rim top. Break brown with black core, fine to medium vegetal temper. Rd 9 cm, Md 31 cm, H 37 cm
60	Unrestricted bowl	Black ware, fine vegetal temper, break black. Simple rim. Inside, below the rim top, impressions similar to a herringbone pattern with white paste filling. Rd 18.5 cm, H 10.8 cm, Th 9.5 mm
60	Deep, slightly restricted bowl [*Fig. 11:5*]	Dark gray-brown, burnished vertically outside. Simple rim, undecorated. Rd 14.7 cm, H 12.5 cm, Th 6.5 mm
66	Beer jar	Noted.
66	Unrestricted bowl [*Fig. 11:7*]	Grayish–brown, break black, fine organic temper. Decorated with incised zigzag inside below the rim. Rd 17 cm, H 13 cm, Th. 6.5 mm
66	Unrestricted bowl [*Fig. 11:8*]	Black ware, fine vegetal temper, break black. Inside, below the rim, impressed zigzag with traces of red paste filling. Oblique cuts on the rim top. Rd 21 cm, H 14.3 cm, Th. 9.5 mm
66	Biconical, restricted bowl [*Fig. 11:6*]	Black ware, break black, fine organic temper, simple rim. Rd 9 cm, Md 13.5 cm, H 8 cm, Th.6.5 mm

Fig. 11. Khor Shambat 1. Vessels from Graves 28 (1–4), 60 (5) and 66 (6–8) (IAE PAN Poznań Khor Shambat Project | photos M. Jórdeczka and J. Wierzbicki)

ing 15 barrel-shaped beads (0.9–1.1 cm long, 0.7–0.9 cm in diameter) and four oblate ones (0.6–0.9 cm in size). Another nine oblate beads were made of turquoise-colored faience (dimensions same as in Grave 60). Quartz and faience beads appeared side by side. A total of 16 beads were made of carnelian, including eight oblate beads and four double- or triple-segmented oblates with dimensions similar to those found in Grave 60. A total of 66 beads were made from an unidentified gray stone and included 50 single, 10 double and six triple beads [see *Fig. 9*].

ARCHER'S RINGS

So-called archer's rings were found near human remains in Graves 60 and 66. The ring found in Grave 60 had a regular shape and trapezoidal section [see *Fig. 7*]. The piece was 3.2 cm long, the maximum and minimum diameters respectively 4.5 cm and 3.5 cm. The hole was drilled from both sides and had a diameter of 1.8–2.0 cm. The ring was made of a light gray fine-grained sandstone. The second piece (probably made of limestone) coming from Grave 66 was trapezoidal in section but with slightly concave sides. It was 4.2 cm long with the diameters respectively 4.5 cm and 3.5 cm, maximum and minimum; the hole was 1.8–2.0 cm.

IRON ARROWHEADS

Two single-barbed iron arrowheads with triangular points and a separate stem, 4.3 cm and 4.8 cm long, were discovered in Grave 66 [see *Fig. 9*].

SOME ANTHROPOLOGICAL REMARKS

The small number of skeletons (12) does not support generalized conclusions concerning the biostructure of the population living in Khor Shambat during the Meroitic and post-Meroitic periods. Some more general remarks are possible, however, and only further research will show whether these findings can be ex-

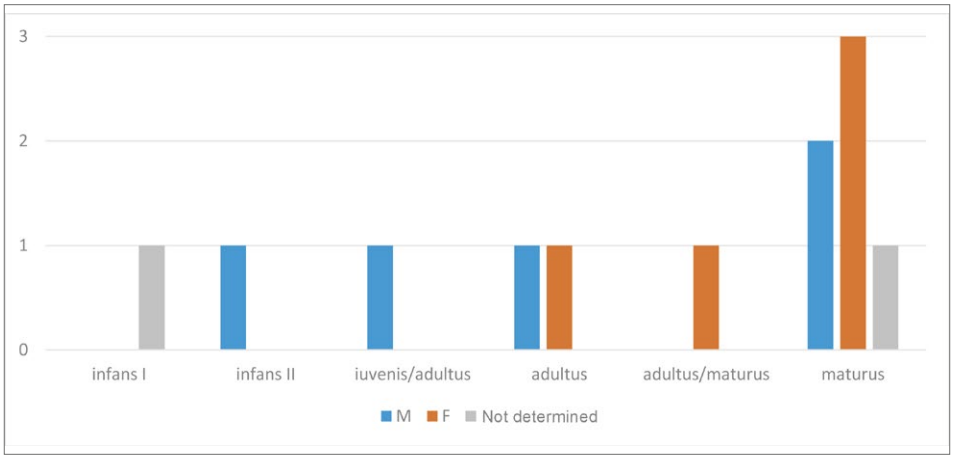

Fig. 12. Khor Shambat 1. Structure of age and sex of individuals from the Meroitic/post-Meroitic cemetery (IAE PAN Poznań Khor Shambat Project | processing Ł.M. Stanaszek)

trapolated to the rest of the population residing in the vicinity of Khor Shambat.

An analysis of the structure of the studied group in terms of age and sex showed that adults predominated (10), most of them (7) having reached maturity (within the *adultus/maturus* and *maturus* range). One person (Grave 60), probably male, died as a *iuvenis/adultus* (18–20 years old). He must have been considered by the community as an adult, having obviously reached a reproductive age. With regard to the sex of the deceased, women (4M, 5F) slightly outnumbered men, although in one case (Grave 50), the sex could not be determined [***Fig. 12***].

The two non-adult skeletons (Graves 36 and 40) were individuals who died in earlier (*infans* I, approximately two years old) and later infancy (*infans* II, approximately 8–10 years old); the latter individual was probably male. The high mortality of children is primarily associated with the high sensitivity of young organism to external factors (lack of individual immunity), as well as lack of everyday hygiene (Pyżuk 2004: 41).

The bulk of the pathologies noted were due to age-related degenerative-deforming processes; these are visible mainly in and around the spine (Gładykowska-Rzeczycka 1976; Buikstra and Ubelaker 1994). In addition to general degenerative changes (i.e., bone infiltration, roughness, deformed articular surfaces) visible in all parts of the skeleton (Graves 22, 24, 26, 50), these especially included osteophytic lipping and bone infiltration on the edges of vertebral bodies (Graves 22, 24, 39), but also typical stressors, such as Schmorl's nodes (Graves 22, 24, 28) or flattening of the vertebral bodies (Graves 22, 28, 39). In addition, traces of healed injuries in the left lower leg area as well as post-inflammatory and stress lesions within the left lower limb (femur and knee joint) were noted in the mature men from Graves 22 and 24. Other conditions detected include dental calculus (Graves 22, 60, 66), tooth decay (Graves 31, 60), periodontitis (Graves 22, 31) and reduced alveolar bone in the maxilla and mandible (Grave 31). *Cribra orbitalia* was observed in Graves 31 and 60 in a mature woman and a young man respectively, witness to a particular form of nutritional stress, iron deficiency, anemia and/or parasites. In contrast, severe prognathism was detected in two young men from Graves 60 and 66, providing evidence as to the archimorphic traits of their skulls.

Body stature estimates for most of the analyzed individuals, that is, five women (Graves 26, 28, 31, 32, 39) and four men (Graves 22, 24, 60, 66 provided data for a comparative analysis [***Fig. 13***]. Sexual dimorphism can be observed in this study group. Male stature ranged from 166 cm to 179 cm (with one exception of a very tall man (187–190 cm) from Grave 22, whose bones bear signs of acromegaly), while women were 10 cm shorter on average (168–150 cm). In general, both men and women were either tall or very tall, which may indirectly suggest a population enjoying fairly good living conditions.

CHRONOLOGY

From a typological point of view, the artifacts from the cemetery in Khor Shambat find formal parallels among finds from Meroitic, but above all post-Meroitic sites. This proves the long duration of both funerary rites and individual forms of grave goods. Similar forms of burials, in terms of pit shape, body arrangement and grave goods, were discovered at the cemetery referred to as Meroitic in Kadero (Krzyżaniak and Krzyżaniak 2011) and Al Khiday (Usai et al. 2014). The latter cemetery has yielded absolute dates in the 1st century AD. In Grave 25 at the cemetery in Kadero, similar types of bowls—open and globular—were recorded, so was a bracelet made of quartz beads. A similar bracelet was also found in Grave 26 at the same cemetery (Krzyżaniak and Krzyżaniak 2011: 204; Chłodnicki, Bagińska, and Polkowski 2015: 196), while an archer's ring and an iron arrowhead were found in Grave 30 (Krzyżaniak and Krzyżaniak 2011: 206; Chłodnicki, Bagińska and Polkowski 2015: 196). On one of the bowls from Grave 66 at KSH 1, the rim was additionally decorated with incisions [see *Table 2*]. Similar bowls in Kadero are dated to the Meroitic period (Krzyżaniak and Krzyżaniak 2011: 203), while at the sites in Geili and Kabbashi, they are associated with the late Meroitic/post Meroitic horizon (Caneva 1988: Fig. 28).

Graves 47 and 159 from the Al Khiday cemetery have yielded similar forms of ceramic vessels as those found in all the graves at the KSH 1 cemetery (Usai et al. 2014: 191). Faience beads of similar shape and color were also found in Grave 47, additionally accompanied by ostrich eggshell beads (Usai et al. 2014: 192). Similar forms of so-called beer jars with their characteristic globular shape and narrow neck were found in Tumuli 6 and 10 at Hagar el-Beida Site 1, dated to the late Meroitic/post-Meroitic period (around the Fourth Cataract on the Nile; Chłodnicki, Bagińska and Polkowski 2015: 199–200, 219). An assem-

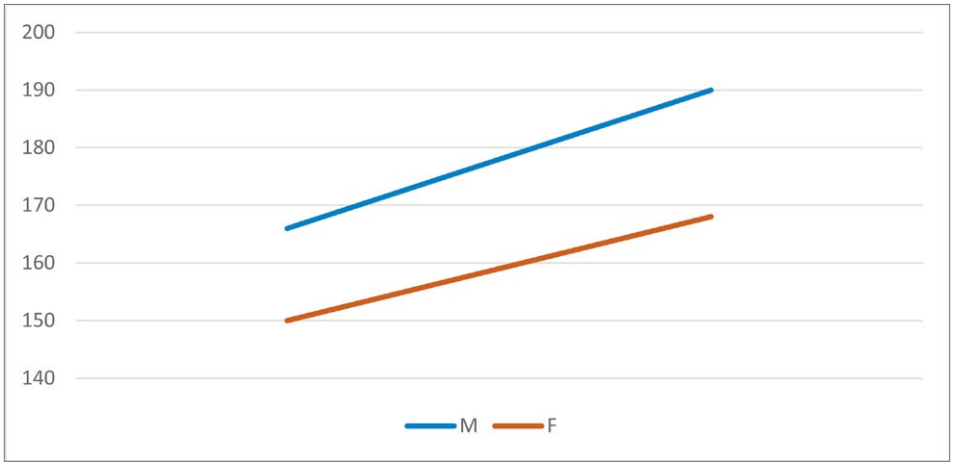

Fig. 13. Khor Shambat 1. Stature (in cm) variation in men (M) and women (F) from the Meroitic/post-Meroitic period (IAE PAN Poznań Khor Shambat Project | processing Ł.M. Stanaszek)

blage of such vessels, containing both beer jars and bowls, was found in the so-called Prince's grave at the site (Chłodnicki, Bagińska and Polkowski 2015: 214–215). Similar forms of turquoise-colored faience beads were found at the same site in Tumuli 5 and 10 at Hagar el-Beida Site 1, and Tumulus 25 at Hagar el-Beida Site 2 (Chłodnicki, Bagińska and Polkowski 2015: 226–228). All these burial features are dated to the post-Meroitic period. Similar assemblages of vessels (mainly bowls of all shapes) and personal jewellery are found in post-Meroitic graves in Gabati in Central Sudan (see, for example, Edwards 1998: 72 Fig. 4.2, 76–77 Fig. 4.4;, 95–97 Fig. 4.15, 110 Pl. 85, 111 Pl. 90). Post-Meroitic graves from this cemetery are dated from the beginning of the 5th to the mid-8th century AD.

Five iron arrowheads were found, including four with single barbs in Tumulus 52 at Hagar el-Beida Site 1 (Chłodnicki, Bagińska and Polkowski 2015: 241). Five similar arrowheads were also found in post-Meroitic Grave 72B at the cemetery in Gabati (Edwards 1998: 87, Fig. 5.12). The closest formal analogy to the content of Graves 60 and 66 at Khor Shambat can be found in the grave of an archer (Tumulus 1) at the Fox Hill site in Jebel Sabaloka. The "architecture" of the grave, body position and typical burial goods (beer jars, arrowheads, personal jewelry) from this grave are all amazingly similar to the burials from KSH 1 described here.

Signal grass seeds of the *Brachiaria ramosa* species found in a burial context at KSH 1 were radiocarbon-dated to between 258–381 cal AD (at 1-sigma; 1720 ± 30 ^{14}C BP; Pokorná et al. 2014).

An extremely important component for dating are the blue and green glass beads found in the context of Grave 28. Parallels from post-Meroitic contexts include the cemeteries at Faras East 195, Abka 425 and el-Zuma (green) and Bab Kalabsha and el-Zuma (Then-Obłuska and Wagner 2019: 91). They were made of glass produced in the southern Asian zone, in the region of India and Sri Lanka. According to Joanna Then-Obłuska, imports of glass beads from the Levantine zone, which supplemented local Egyptian products during the Meroitic period, were replaced after the fall of the Meroe Kingdom (in the post-Meroitic period) by imports from the Indo-Pacific zone (Then-Obłuska and Wagner 2019: 180). The Khor Shambat site is the southernmost point in northeastern Africa where this type of import has been recognized.

SUMMARY

The graves from Khor Shambat probably represent only a fraction of the cemetery that functioned at the site during the post-Meroitic period. To date, a mere 1% of this site has been studied, yet the frequency of graves and their distribution over a relatively large area (several clusters) could indicate a much larger scale. The location was most likely extremely attractive for the Meroitic and post-Meroitic inhabitants of central Sudan, as much as for the prehistoric hunters-gatherers and Neolithic shepherds. For 650 years, between 300 BC and 350 AD, the Kingdom of Meroe grew and developed in the territory of modern Sudan. The transfer, effected by King Arkamani I at

the beginning of the 3rd century BC, of the country's capital and the royal cemetery to the region between the Fifth and Sixth Nile cataracts (today's Butana Highland) is considered as the beginning of this new period in the development of the Kush state. Large urban centers developed in this area, with the capital and necropolis in Meroe at the forefront, as well as Naga, Wad Ben Naga and Musawwarat el-Sufra. Cities in the north, such as Napata, maintained their status, but the greater burden of settlement moved to the area of Butana. About 220 BC, the borders of the Meroe state in the north reached the region of Aswan and the First Cataract on the Nile. At the turn of the 4th/5th century, the Meroitic state disintegrated into a number of smaller states. The invasion of the Kingdom of Axum from Ethiopia, which destroyed Meroe and reached the confluence of the Atbara and the Nile, is assumed to be the main reason for the fall of the Meroitic kingdom (Chłodnicki, Bagińska and Polkowski 2015: 184). The period between the fall of the Meroitic Kingdom and the rise of Christian states (between AD 350 and 543) is referred to as the post-Meroitic period. Most likely, a number of smaller states was established during this time under a variety of influences, but retaining for the most part older traditions. This is especially visible during the older period (4th to 5th century), when graves contain burial goods characteristic of the new society, as well as numerous objects of a Meroitic legacy, which can be observed in the cemetery at Khor Shambat 1. In Lower Nubia, centers were developed in Faras-Ballaña; on the middle Nile, they appeared in the area of el-Zuma and Old Dongola, while in the south, near el Hobaji–Soba, near the Sixth Cataract and the confluence of the two Niles (Chłodnicki, Bagińska, and Polkowski 2015: 216). The cemetery in Khor Shambat was probably in the zone of influence of the population from this center.

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References

Bobrowski, P., Jórdeczka, M., Sobkowiak-Tabaka, I., and Binder, M. (2016). Khor Shambat 1: New Neolithic site and cemetery in Omdurman (Sudan). *PAM*, 25, 447–478

Buikstra, J.E. and Ubelaker, D.H. (eds). (1994). *Standards for data collection from human skeletal remains: Proceedings of a seminar at the Field Museum of Natural History, organized by Jonathan Haas* (=*Arkansas Archeological Survey Research Series* 44). Fayetteville, AR: Arkansas Archeological Survey

Caneva, I. (ed.). (1988). *El Geili: The history of a middle Nile environment, 7000 B.C.–A.D. 1500* (=*BAR IS* 424). Oxford: B.A.R.

Chłodnicki, M. with contribution of D. Bagińska and P. Polkowski. (2015). *Archaeology of the Sudan: Catalogue of the exhibition in the Poznań Archaeological Museum*. Poznań: Poznań Archaeological Museum

Edwards, D.N. (1998). *Gabati: A Meroitic, post-Meroitic and medieval cemetery in central Sudan* I (=*BAR IS* 740). Oxford: Archaeopress

Gładykowska-Rzeczycka, J. (1976). Zmiany w układzie kostnym ludności ze średniowiecznych cmentarzysk (Pathological changes in skeletons from medieval cemeteries). In *Badania populacji ludzkich na materiałach współczesnych i historycznych: Materiały z naukowej sesji antropologicznej w dniu 17 X 1975* (pp. 85–103). Poznań: Wydawnictwo Naukowe UAM (in Polish with English summary)

Jórdeczka, M., Chłodnicki, M., Sobkowiak-Tabaka, I., and Stanaszek, Ł.M. (2020a). Rebirth in the afterlife: Neolithic pot burials from Khor Shambat, Sudan. *Azania: Archaeological Research in Africa*, 55(1), 44–68

Jórdeczka, M., Stanaszek, Ł.M., Bobrowski, P., Chłodnicki, M., and Sobkowiak-Tabaka, I. (2020b). Neolithic inhabitants of Khor Shambat 1, Sudan. *Archaeologia Polona*, 58, 135–163

Krzyżaniak, A. and Krzyżaniak, L. (2011). The Meroitic cemetery. In M. Chłodnicki, M. Kobusiewicz, and K. Kroeper (eds), *Kadero: The Lech Krzyżaniak excavations in the Sudan* (=*Studies in African Archaeology* 10) (pp. 199–210). Poznań: Muzeum Archeologiczne w Poznaniu

Pokorná, A., Suková, L., Varadzin, L., Novák, J., Juřičková, L., Havelková, P., and Pokorný, P. (2014). *An early post-Meroitic burial of an archer at Jebel Sabaloka. Multidisciplinary investigation*. Poster presented at the 13th International Conference for Nubian Studies, Université de Neuchâtel, 1–6 September 2014

Pyżuk, M. (2004). Antropologiczna interpretacja szczątków kostnych populacji kultur przeworskiej i wielbarskiej z Kołozębia, pow. Płońsk (Anthropological interpretation of skeletal remains of the Przeworsk and Wielbark Culture population from Kołozął in Płońsk district). *Archeologia Polski*, 49(1–2), 33–48 (in Polish with English summary)

Stanaszek, Ł.M. (2016). *Analiza antropologiczna szczątków ludzkich ze stanowiska Khor Shambat (sezon 2016)* (Anthropological analysis of human remains from the Khor Shambat site [2016 season]). Unpubl. typescript in the archives of IAE PAN Poznań (in Polish)

Stanaszek, Ł.M. (2017). *Analiza antropologiczna szczątków ludzkich ze stanowiska Khor Shambat (sezon 2017)* (Anthropological analysis of human remains from the Khor Shambat site [2017 season]). Unpubl. typescript in the archives of IAE PAN Poznań (in Polish)

Stanaszek, Ł.M. (2018). *Analiza antropologiczna szczątków ludzkich ze stanowiska Khor Shambat (sezon 2018)* (Anthropological analysis of human remains from the Khor Shambat site [2018 season]). Unpubl. typescript in the archives of IAE PAN Poznań (in Polish)

Then-Obłuska, J. and Wagner, B. (2019). *Glass bead trade in Northeast Africa. The evidence from Meroitic and post-Meroitic Nubia* (=*PAM Monograph Series* 10). Warsaw: PCMA; University of Warsaw Press

Usai, D., Salvatori, S., Jakob, T., and David, R. (2014). The Al Khiday cemetery in Central Sudan and its "Classic/Late Meroitic" period graves. *Journal of African Archaeology*, 12(2), 183–204